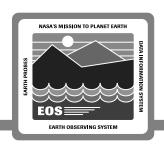


Real-time Prototypes Ken Fregeolle

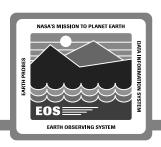
24 August 1995





Prototype Overview

- Resource Management Subsystem
 - String Manager
- Command Subsystem
 - Telecommand Codeblock Cyclic Redundancy Check
 - Frame Operation Procedure Protocol



Resource Management Subsystem

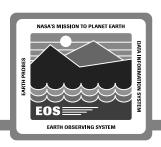
- String Manager Prototype
 - Purpose

Validate Post-PDR distributed RMS concept and design
Evaluate inter-task and inter-CPU communication mechanisms
IPC via Hughes Class Library/HMessage
IPC via Rogue Wave/socket

- Approach

Create a logical string using separate Server and Workstation tasks

Initiate Telemetry Decom prototype via RMS
Implement first-phase prototyping using HCL
Implement second-phase using Rogue Wave



Resource Management Subsystem

- String Manager Prototype (cont'd.)
 - Results

Refined RMS subsystem task definitions

Integrated distributed RMS concept into subsystem critical design

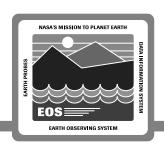
Incorporated H/W & S/W status monitoring into a single Resource Monitor

Devised RMS "smart request" objects

Requests to RMS which execute themselves

- Future Goals

Prototype Active/Backup string management Prototype Resource Monitor task



Command Subsystem

- AM-1 Cyclic Redundancy Check Prototype
 - Purpose

Evaluate potential CRC mechanisms and implementations

- Approach

Simulate AM-1 ICD-106 model for Telecommand Codeblock encoding

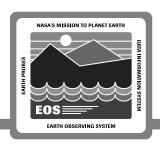
- Results

Developed reusable, generic CRC class

(for production use)

Devised virtual CRC algorithm concept

Assisted spacecraft manufacturer regarding expected CRC results



Command Subsystem

- Frame Operation Procedure Prototype
 - Purpose

Demonstrate FOP-1 functionality via software state-machine Prototype CLCW interpretation and spacecraft/ground synchronization

- Approach

Evaluate FOP-1 state-table alternatives

Array of function pointers

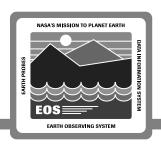
Class hierarchy of states

Create tool for testing FOP-1 protocol

Create CLCWs

Generate 26 of 41 potential FOP-1 events

Utilize CSS API for inter-task communication



Command Subsystem

- Frame Operation Procedure Prototype (cont'd.)
 - Results

Selected class-based state machine for use in subsystem critical design

- Future Goals

Build entire command through CLTU based upon command mnemonic

Simulate transmission of CLTU

Integrate CLTU and FOP prototypes for closed-loop testing